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None

(58) Field of search

G4H

## (54) Information communication network

(57) A domestic mainsborne network has a remote control unit 1 for operation of the network, the unit interfacing with a television receiver 2 for displaying selectively the status of the network or a television programme as required. The television receiver 2 is linked to a number of domestic electrical appliances (of which only two, 3 and 4, are shown) by means of the electrical mains wiring system 5.

Remote control unit 1 can generate suitable coded infra-red signals representing commands to achieve any of the following functions when required: channel selection; insertion, into the memory store of television receiver 2, of network information; status interrogation of one or more of the appliances and display instructions concerning their status for television receiver 2; instruction to change the status of any of the appliances; volume control or display adjustment of a display image.

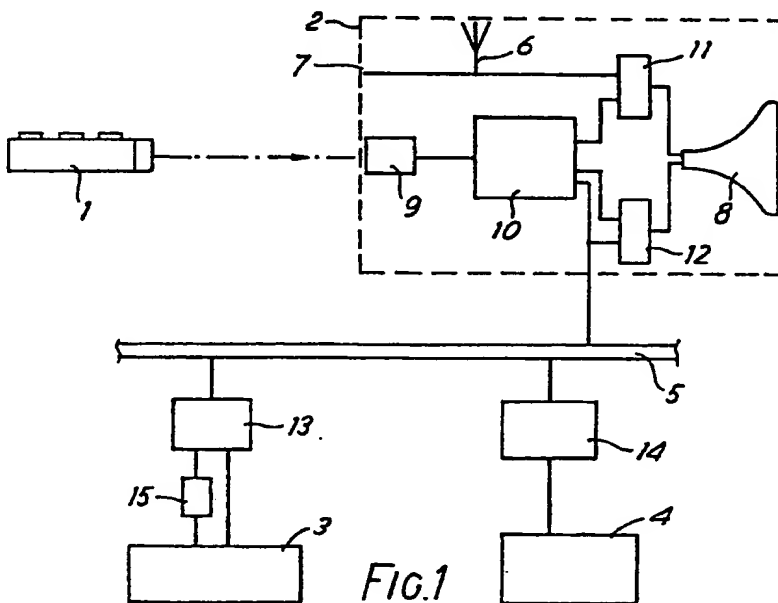
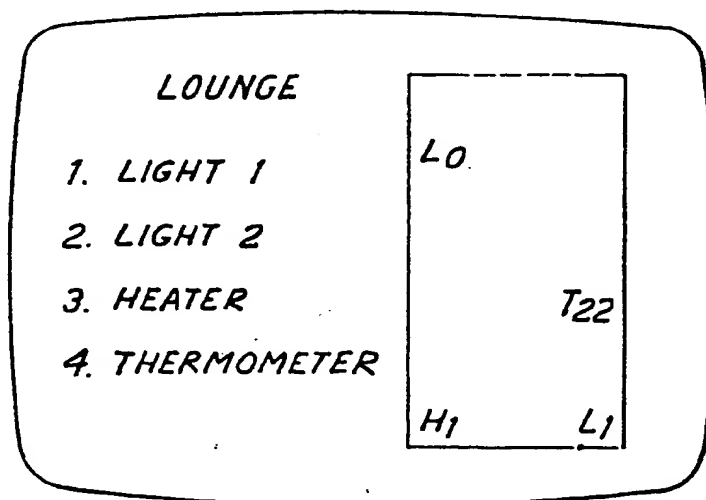
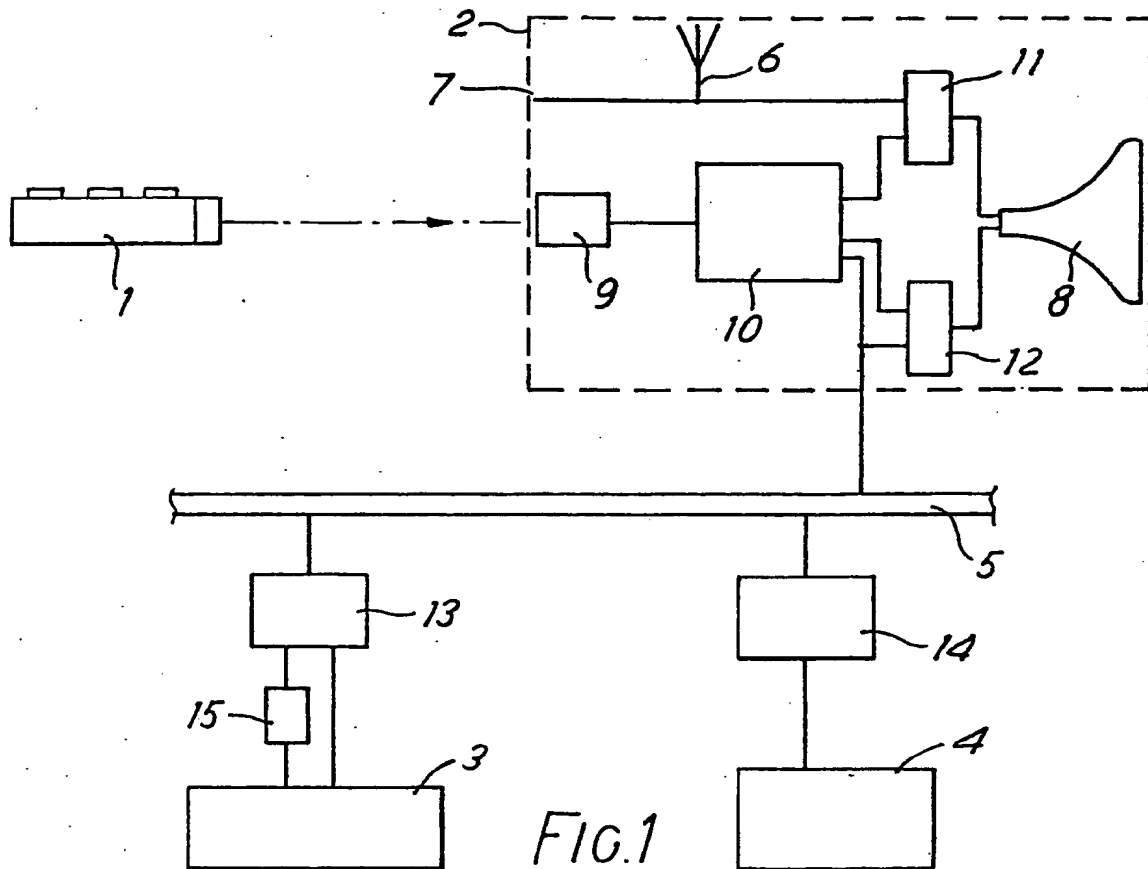


FIG.1

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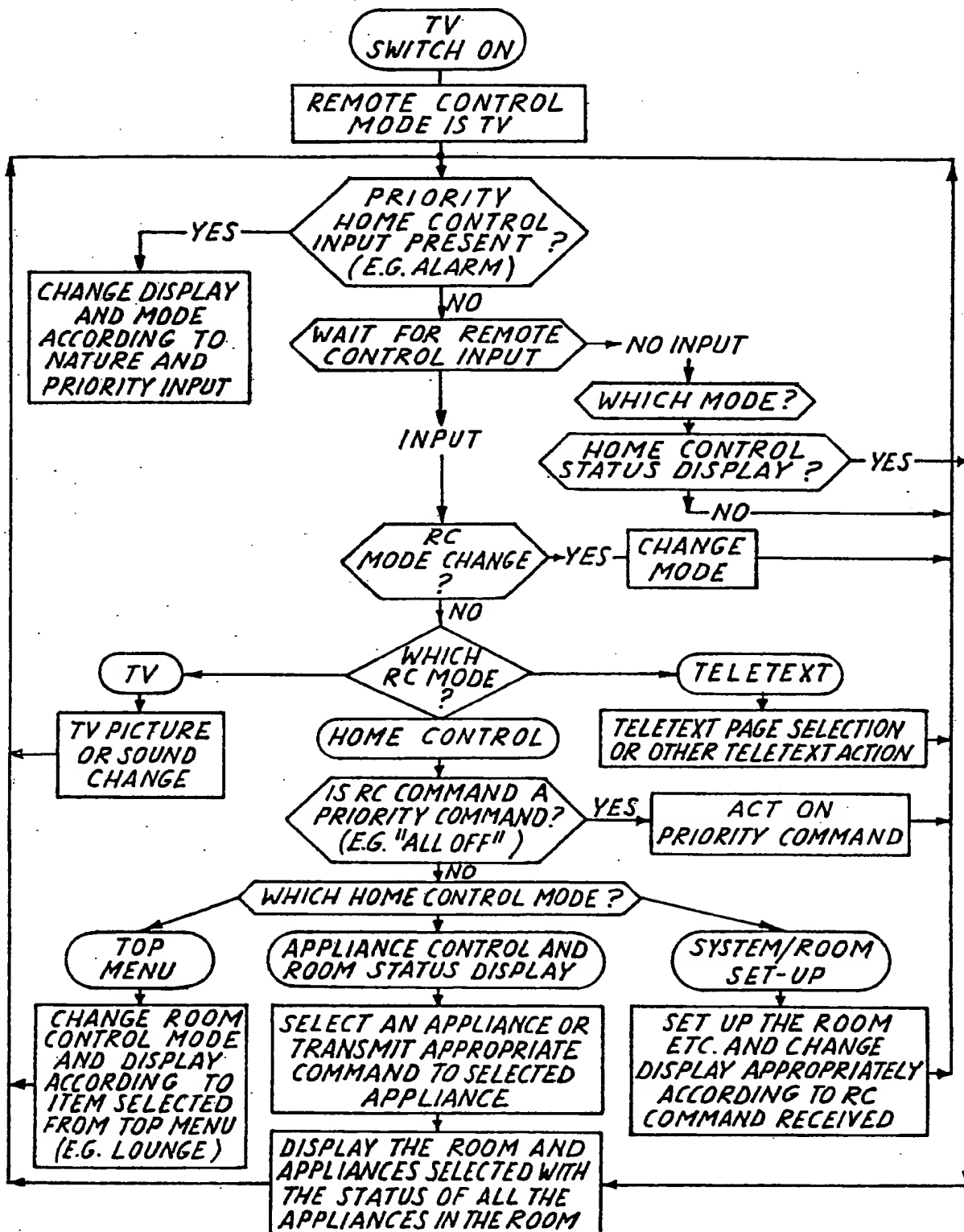


FIG. 3

## SPECIFICATION

### Information communication network

5 The present invention relates to an information communication network particularly but not solely for use in domestic mainsborne applications.

The present invention provides a mains-borne network comprising:  
10 a plurality of electrical appliances, each of which is electrically connected to a common circuit of an electrical mains wiring system; each electrical appliance having means to  
15 control its operation and/or means to identify its present operational status;

a television receiver connected to the electrical mains common circuit for display of the present operational status of any one or more  
20 of the appliances in the network;

an infra-red remote control unit for the television receiver, the unit having means to generate command signals for controlling operation of any of the electrical appliances  
25 and/or of the television receiver display relating to their operational status.

Preferably in the network, the remote control unit for the television receiver has means to generate command signals for selectively  
30 activating the operation-control means of any of the electrical appliances.

Also the remote control unit may comprise means to generate command signals for selectively activating the status-identifying means  
35 of any of the electrical appliances.

Furthermore, the remote control unit may comprise means to generate command signals for activating the television receiver to display the present status of any of the electrical  
40 appliances.

The television receiver may utilize its teletext facilities and/or its viewdata facilities in preparation of display of information on its screen. Preferably the remote control unit generates infra-red signals.  
45

Any one or more of the following forms of electrical appliance may be used in a mainsborne network of the present invention: a light switch (whether solely with "on"/"off" settings  
50 or with additional dimmer settings), heater, cooker, door-lock, thermometer, burglar alarm, smoke detector.

The television receiver may have means to display a plan of one or more rooms within the mainsborne network, the plan indicating the position and operational status of each electrical appliance within a room.  
55

In order that the invention may more readily be understood, a description is now given, by way of example only, reference being made to the accompanying drawings, in which:  
60

Figure 1 is a schematic diagram of part of a mainsborne network embodying the present invention;

65 Figure 2 is an illustration of a display on the

screen of a television receiver in the network of Figure 1; and

Figure 3 is a flow diagram of the operation of the network of Figure 1.

70 A domestic mainsborne network as shown in Figure 1 has a remote control unit for operation of the network, the unit interfacing with a television receiver 2 for displaying selectively the status of the network or a  
75 television programme as required. The television receiver 2 is linked to a number of electrical appliances (of which only two, 3 and 4, are shown) within the house by means of the electrical mains wiring system 5, common  
80 to the house; this link enables the two-way passage of data signals between the television receiver and the appliances. Of course, the signals travel between the appliance or receiver and the electrical mains wiring system  
85 5 by means of the conventional power wire connection.

More specifically, the remote control unit 1 can generate suitably coded infra-red signals representing commands to achieve any of the  
90 following functions when required: channel selection of broadcasts received via aerial 6 and/or of programmes received via cable network 7; insertion, into the memory store of television receiver 2, of information relating to  
95 the lay-out and operation of the mainsborne network; interrogation as to the status of one or more of the appliances within the network and instructions to display information concerning their status on the screen 8 of the  
100 television receiver 2; instruction to change the status of any of the appliances; volume control or display adjustment of the image on screen 8.

The television receiver 2 has an infra-red  
105 receptor 9 which converts the signals from unit 1 into electrical signals and passes them to a central control unit 10 incorporating one or more microprocessors and a memory store of suitable storage capacity. This unit 10  
110 identifies the type of command represented by any signals it receives from receptor 9, and then suitably processes and directs that signal. Thus for example, when the television receiver 2 is in the mode for displaying programmes originating from aerial 6 or input 7,  
115 any commands relating to channel selection, volume control or display adjustment are sent directly to the standard video processing unit 11; if, with the television receiver 2 in this mode, unit 10 identifies a command signal  
120 instructing the television receiver 2 to the "mainsborne network" mode, then unit 10 disables the standard video processing unit 11 and instructs a network display processing unit 12 to prepare information for display on  
125 screen 8.

If unit 10 identifies command signals relating to information on the network for storage, they are directed to the internal memory store  
130 with a simultaneous display on screen 8 (via

unit 12). Clearly, in this way the information relating to the network layout can be up-dated at any time.

If unit 10 identifies command signals relating to interrogating and/or instructing one or more of the appliances 3 and 4, it directs signals of appropriate form into the electrical mains wiring system 5, simultaneously passing signals also to unit 12 for display on the screen 8. Any signals originating from the appliances (whether in reply to these command signals or not) pass to unit 10 which amends the information held within the internal store and/or displays the information on screen 8, as appropriate.

Each of the appliances in the network has a processor unit (13 or 14 respectively for the two appliances illustrated) which monitors all the command signals passing along the wiring system 5 in order to identify any which are intended for its respective appliance. The processor unit 13 or 14 is also able to "read" the message of any appropriate command signal, and produce a relevant instruction for the appliance. For example processor unit 13 can interrogate appliance 3 directly to determine its status (i.e. whether it is "on" or "off"), or it can instruct a switch 15 to change the status of appliance 3, or it can do both actions; thereafter, it sends a signal back to the television receiver 2 indicating any change in the status of appliance 3. The arrangement of controls for appliance 4 differs in that processor 14 continuously sends signals of the output from appliance 4 (which may for example be a thermometer for monitoring room temperature) to unit 10 for the latter to maintain continual control of another appliance (for example a heater in the same room), whether or not the output of appliance 4 is to be displayed on screen 8 at any given time.

The network as described above can be designed to have the following additional facilities: the unit 10 can be pre-programmed to operate any one or more of the appliances at specified times (for example to switch on and off lights so as to give the appearance of the house being occupied when it is in fact empty); when any of the appliances are manually operated, its processor unit sends a signal to television receiver 2 to update the information held in its memory and/or displayed on screen 8; the appliances can send information and/or instructions to one another either directly along the wiring system 5 or via television receiver 2; operation of the appliances can be controlled (either by the remote control unit 1 or according to pre-programmed instructions in unit 10) even when the television processing units 8, 11 and 12 are isolated from the electrical mains; a specified single command from remote control unit 1 deactivates all the appliances and the receiver and isolates them from the electrical mains

(thereby minimizing additional damage to the house during a fire or a flood).

In one advantageous embodiment of the network described above, the remote control unit 1 activates a display of options on screen 8 from which the person operating the network must choose. Thus the person can call up a "menu" of rooms within the network, as follows:

1. LOUNGE
2. DINING ROOM
3. KITCHEN
4. HALL
5. BEDROOM 1
6. BEDROOM 2
7. BATHROOM
8. STUDY
9. UTILITY
0. OTHER.

Thus, for example, by pressing a button marked "1" on remote control unit 1 in order to select the lounge, the person can call up a display of the room plan of the lounge, indicating the location and states of any appliances in the network. From the example shown in Figure 2 it can be seen that the lounge is a rectangular room with a door at the lower right-hand end and a window at the centre of the upper end, with two lights (their positions designated by the letters "L"), one heater (its position designated by the letter "H") and one thermometer (its position designated by the letter "T"). On the display of the room plan, the suffix to the letters "L" and "H" represents status of that appliance, with "1" indicating that it is switched on and "0" that it is switched off; the suffix to the letter "T" indicates the reading of the thermometer, namely 22° Centigrade. The letters, their suffixes and the list of four options of the appliance are usually displayed on the screen 8 in yellow script; however, if while the room plan is on display, the person presses button "1" of the remote control unit in order to select option 1, then the script of that option and of the corresponding appliance in the room plan changes to red.

Information on the number of rooms, their names, their layouts and the appliances they contain can be programmed into the unit 10 either via the remote control unit 1 or via a separate programming unit which is temporarily directly connected to unit 10 specifically for that purpose. Also, the information held in the memory store of unit 10 can be updated at any subsequent time by either of these methods.

Figure 3 is a flow diagram which provides a description of the operational steps for the mainsborne network when using the television remote control system incorporating the "Home Control" feature which is generally described hereinbefore.

In a modification to the network described above, the electrical mains wiring system is

not used for the passage of information signals between the television receiver and any appliances in the network. Instead, the passage of such signals is achieved by using, for example, a separate hard-wired electrical circuit specifically reserved for this function; alternatively, such signals are broadcast from the receiver to the appliances and vice versa.

## 10 CLAIMS

1. A mainsborne network comprising:
  - a plurality of electrical appliances, each of which is electrically connected to a common circuit of an electrical mains wiring system;
- 15 each electrical appliance having means to control its operation and/or means to identify its present operational status;
  - a television receiver connected to the electrical mains common circuit for display of the
- 20 present operational status of any one or more of the appliances in the network;
  - an infra-red remote control unit for the television receiver, the unit having means to generate command signals for controlling operation of any of the electrical appliances
- 25 and/or of the television receiver display relating to their operational status.
2. A network according to Claim 1, wherein the remote control unit has means to generate
- 30 command signals for selectively activating the operation-control means of any of the electrical appliances.
3. A network according to Claim 1 or Claim 2, wherein the remote control unit has means
- 35 to generate command signals for selectively activating the status-identifying means of any of the electrical appliances.
4. A network according to any one of the preceding claims wherein the remote control
- 40 unit has means to generate command signals for activating the television receiver to display the present status of any of the electrical appliances.
5. A network substantially as hereinbefore
- 45 described with reference to and as illustrated in any one or more of Figures 1 to 3 of the accompanying drawings.